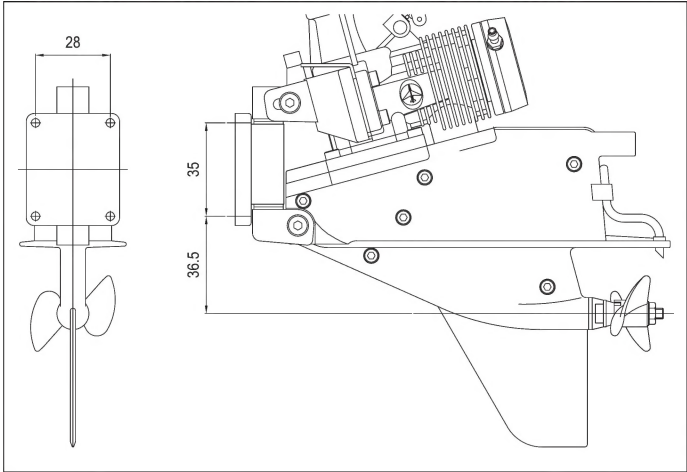


ENGINE INSTALLATION

Locate your engine mount on the transom so that the lowest part of the sponsons (for tunnel hull), the riding surface (for hydro hull) or the shallow V hull bottom are approximate to the propeller thrust line. Be sure to follow the specific engine mounting instruction contained in your boat kit.



BREAK-IN PROCEDURES

Because your Thunder Tiger engine has been precision-made from quality materials and is an ABC-type engine, a prolonged break-in period is not necessary. However, for long life and high performance, proper break-in is recommended.

- 1) We strongly recommend a fuel containing 20% castor oil or castor/synthetic blend with no more than 10% nitromethane to be used for break-in. We strongly discourage using fuel containing only synthetic lubricants during the initial break-in period.
- 2) Turn the needle valve clockwise until you begin to feel resistance. This is the fully closed position. Do not force the needle valve or you may damage your carburetor! Now turn the needle valve counter-clockwise about 2-2 1/2 turns. This will be a good place to start. Turning the needle valve clockwise is to “close” for learner mixture, while counter-clockwise is to “open” for richer mixture.
- 3) Turn on your control system and shift the throttle stick to test and prime your engine until the fuel is draw into the carburetor. It needs more choke for the first starting or when the engine is cold. Turn the flywheel by using an electric starter to start the engine with the throttle slightly opened (approximately 1.5-2.0m/m).The engine should fire after one or two tries.

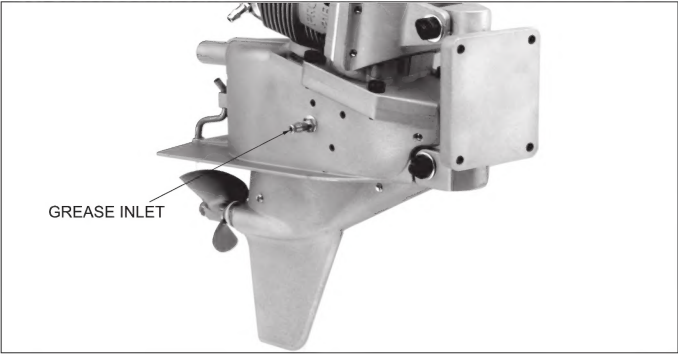
CAUTION

Never operate your engine at high R.P.M. without a “load”, that is, with the boat out of the water. Otherwise, your engine may be damaged in a few seconds due to the lack of load and over-heating from lack of cooling water!

- 4) All adjustments during break-in will be made to the high speed needle valve only. At this point, the engine is running very “rich”. If your engine does not accelerate smoothly (when the throttle is opened from any setting above idle) or run unevenly when idling, please adjust the mixture metering screw as described in the **CARBURETOR ADJUSTMENT** paragraph after break-in.
- 5) Put the boat in the water and readjust the throttle immediately so that the engine does not stop. Allow the engine to run at full-throttle and consume the entire tank of fuel at this needle setting. Take care not to let your boat stop far away from shore.
- 6) After the first tank-full, re-fill the tank. Then close the needle-valve 1/8 turn and restart. During the second tank of fuel, run the engine at alternate throttle settings (i.e. 1/2 throttle for 30 seconds, then full throttle for 30 seconds etc.) for about half the tank. Advance the throttle to full, and slowly lean the needle setting (about 1/8 turn at a time) until the highest speed is obtained.
- 7) At this point, richen the needle setting about 1/8 turn (counter clockwise) and run a third tank of fuel at this needle setting. After 4-5 runs, your engine will be completely broken-in and ready for consistent performance.

LUBRICATING

It is impossible to prevent dirt from entering the lower unit of your outboard, give the volume of water that flow through and by the unit during operation. Therefore, proper lubrication is required after each and every running session to keep your outboard running properly. This is easy work, yet very critical to receiving a long service life from your engine! Unscrew the propeller shaft assembly and remove it along with the flexible shaft. Check and clean the flexible shaft using a soft cloth, then inject a liberal amount of grease into the gearbox through the hole located on the right-side of the lower unit as shown below. Apply a light coating of grease to the flex shaft and reassemble the prop shaft assembly.

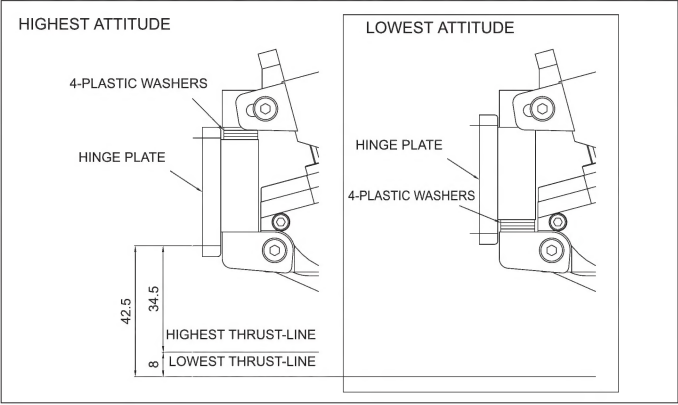


PROPELLER ANGLE ADJUSTMENT

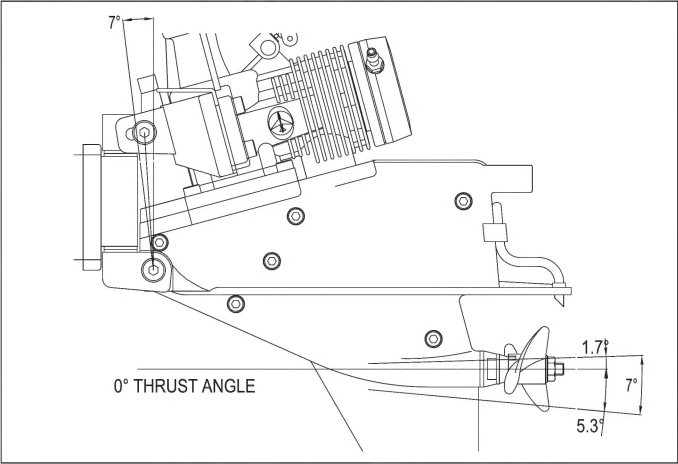
To allow proper tuning for your particular hull, your engine has the ability to adjust engine height by 8mm and adjust the propeller thrust within a range of 7°.

ENGINE HEIGHT ADJUSTMENT

This adjustment alters the distance between the propeller thrust-line and the waterline, which affects the selection and the efficiency of the prop. Your can change the quantity of plastic washers on the hinge pin, as well as the direction of the hinge plate to obtain a total range of 8mm of adjustment. This adjustment will vary from hull to hull, and the optimum setting obtained through testing.



PROPELLER THRUST ANGLE ADJUSTMENT



This adjustment is used to alter relationship of the thrust angle to the center-line of your hull, which affects both the speed and attitude in which your boat performs, i.e. bow high, bow low, etc.

CARBURETOR ADJUSTMENT

Your Thunder Tiger carburetor is specially designed for use with the high performance outboard marine engine. It is able to automatically provide a proper air-fuel mixture at all throttle ranges from idle to full speed. The carburetor has been pre-adjusted at the factory, and should give excellent engine performance in most cases. Large adjustments of the carburetor should not be required. However, different operating conditions (such as your choice of fuel, glow plug, propeller, and climate) may make further adjustments necessary.

NEEDLE VALVE ADJUSTMNET

This is used to adjust the high speed fuel mixture. Optimum setting is described in the **BREAK-IN PROCEDURES**.

MIXTURE METERING SCREW ADJUSTMENT

- This is used to obtain a smooth transition and stable idle.
- 1) After the needle valve has been set, keep running at the highest speed for about 10 seconds, then abruptly close the throttle to the lowest speed. Run at idle for about 5 seconds. Then quickly open the throttle.
 - 2) If the engine hesitates before picking up speed, and there is plenty of smoke and un-burned fuel coming out from the exhaust, the mixture is too rich. Screw in (clockwise) the mixture metering screw about 1/8 turn.
 - 3) On the other hand, if it speeds up before quitting, the mixture is too lean. Screw it out (counter-clockwise) about 1/8 turn.
 - 4) If this is difficult to observe, then allow the engine to idle slightly longer before opening the throttle. Repeat procedure 1) patiently a few times to ensure the best running is obtained.

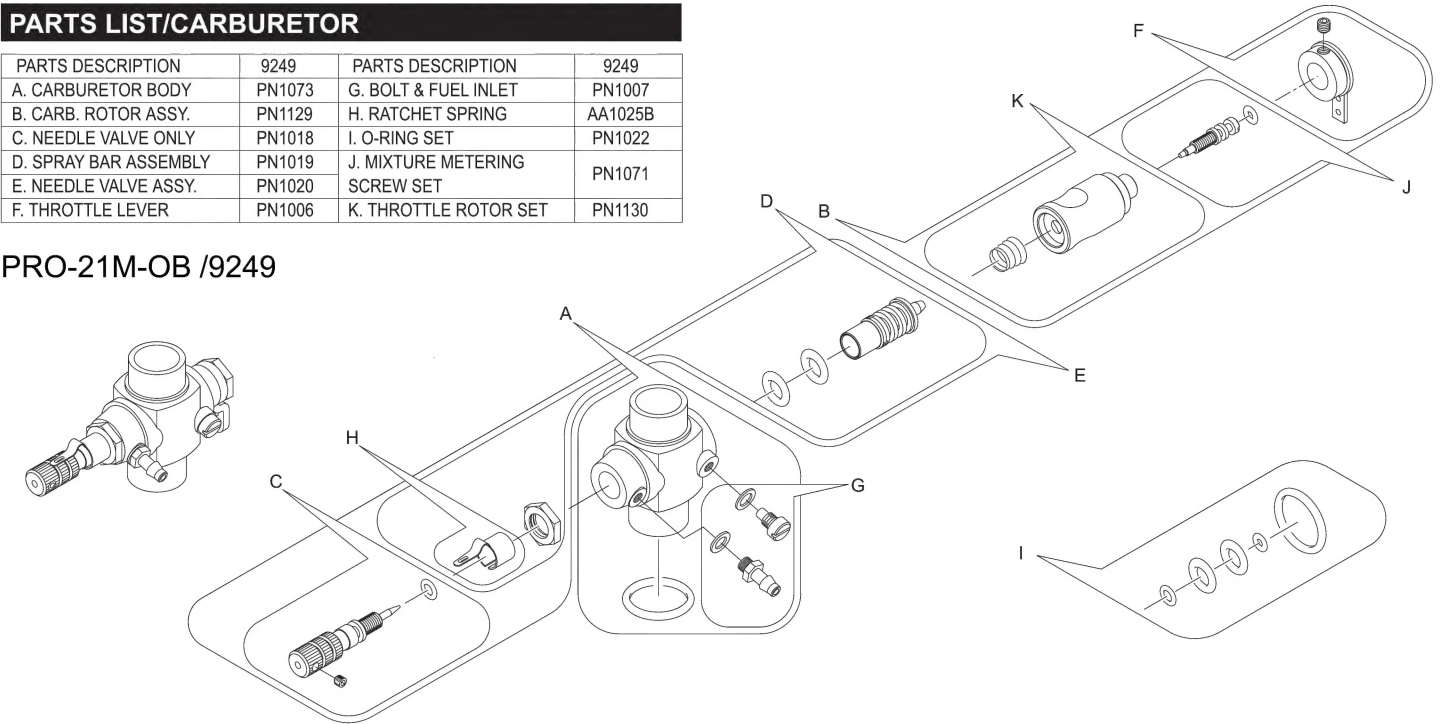
ENGINE CARE

Always keep the outside of your engine clean. Use clean, fresh fuel and keep your fuel can, pump, and fueling system free from dirt particles. Install a fresh fuel filter between the fuel tank and carburetor, and between your fuel pump and filling line to prevent any potential of dirt entering your engine. Model fuel contains alcohol, which is hydroscopic (meaning that it attracts moisture from the atmosphere). This can cause corrosion to the internal engine parts. After each running session, run all the fuel out from inside the engine and disconnect the fuel line from the carburetor. Put 4 or 5 drops of after-run oil (Marvel Mystery Oil, Pacer, etc) into the carburetor and turn the engine over by hand several times to protect the engine bearings and internal parts from corrosion.

PARTS LIST/CARBURETOR

PARTS DESCRIPTION	9249	PARTS DESCRIPTION	9249
A. CARBURETOR BODY	PN1073	G. BOLT & FUEL INLET	PN1007
B. CARB. ROTOR ASSY.	PN1129	H. RATCHET SPRING	AA1025B
C. NEEDLE VALVE ONLY	PN1018	I. O-RING SET	PN1022
D. SPRAY BAR ASSEMBLY	PN1019	J. MIXTURE METERING SCREW SET	PN1071
E. NEEDLE VALVE ASSY.	PN1020		
F. THROTTLE LEVER	PN1006	K. THROTTLE ROTOR SET	PN1130

PRO-21M-OB /9249

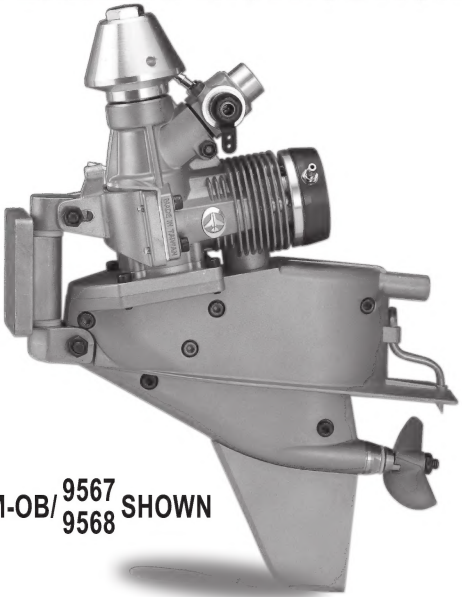


PARTS LIST/ENGINE

DESCRIPTION	9567	9568
1.FLYWEEL NUT	AA0424	
2.STEERING ARM SET	PN0098	
3.FLYWHEEL	PN0099	
4.CRANKSHAFT	AA0263	
5.CRANKCASE	AN0318	
6.BACKPLATE ASSEMBLY	PN0100	
7.CONNECTING ROD	AN0349	
8.WRIST PIN ASSEMBLY	AA0350	
9.CIRCLIP	AA0351	
10.CYLINDER & PISTON	AN0549	
11.WATER COOLED HEAD ASSY.	PN0093	
12.HEAD GASKET	AA0355	
13.CARB. RETAINING BOLT	AN0356	
14.O RING SET	PN0101	
15. CARBURETOR ASSEMBLY	9249	
16.CRANKCASE BEARINGS	PN0166	
17.ENGINE SCREW SET	PN0103	

DESCRIPTION	9567	9568
18.HINGE PLATE ASSEMBLY	PN0104	
19.GEAR SET	PN0112	PN0113
20.LOWER UNIT SET	AN0401	
21.LOWER UNIT GASKET	AA0432	
22.LOWER UNIT SCREW SET	PN0106	
23.FLEX SHAFT	AA0417	
24.FLEX SHAFT GUIDE	AA0418	
25.PROP. SHAFT ASSEMBLY	PN0107	
26.PROPELLER	AJ0080	
27.PROP. NUT	AMM4Z	
28.WATER INTAKE	AA0422	
29.ADJUSTMENT WASHERS	PN0108	
30.HINGE PIN	AA0420	
31.C RING W/WASHER SET	PN0111	
32.BACKPLATE BEARINGS	PN0109	
33.BEVEL GEAR BEARINGS	PN0110	
34.SPRING PIN	PN0115	

THUNDER TIGER
OUTBOARD MARINE ENGINE
OPERATING INSTRUCTIONS



PRO-21M-OB/9567
9568 SHOWN

IMPORTANT

Be certain to completely read all of the instructions supplied with your engine, and pay close attention to the “**SAFETY INSTRUCTIONS AND WARNINGS**”.

INTRODUCTION

Congratulations on your purchase of a Thunder Tiger outboard marine engine. The engine has been designed for radio-controlled model boats to combine high performance with easy handling and maintenance using modern CAD computer technology manufacturing techniques. Major engine components are machined from the highest quality materials using state-of-the art CNC manufacturing techniques, resulting in consistently high performance and reliability. The engine is equipped with Schnuerle porting, ABC type piston and cylinder, five ball-bearings and roller-bearing, built-in muffler, reduction gear system, adjustable thrust line system, high performance propeller and automatic mixture control carburetor.

SPECIAL ATTENTION

When you rotate the flywheel by hand, your may find that it becomes rough or “notchy” as the piston approaches TDC (Top Dead Center). This is not a defect or manufacturing fault, indeed it is normal for an engine of ABC type construction. When the engine runs, the cylinder actually expands as it heats up. The cylinder has been precision machined so that (at optimum operating temperature) the cylinder walls are perfectly aligned with the piston. As the engine cools after a run, you will notice that the tightness will actually return. This is normal and typical of an ABC type engine.

SPECIFICATION

REF.NO	9567	9568
DISPLACEMENT	3.46cc/0.211cu.in	
BORE	16.6mm/0.654in	
STROKE	16.0mm/0.630in	
REDUCTION GEAR RATIO	1.19:1	1.04:1
PRACTICAL R.P.M.RANGE	3,000-38,000	
PROP OUTPUT	2.1/30,000 -(BHP/RPM)	
WEIGHT	720g/35.37oz	

FUEL

A good quality, commercially available fuel containing 25% lubricant and 75% methanol is recommended for break-in/run-in and general usage, We also recommend castor oil or a castor/synthetic blend only for use as a lubricant. Fuel containing 5 % -15 % nitromethane and 20 % lubricant is for use when

more power is required. Most fuels containing synthetic, lubricants (only) are much less tolerant of a lean run compared to fuel that contains castor oil. If availability or local conditions force you to use a fuel that contains only synthetic lubricant, we suggest that you keep your needle valve set to a slightly richer setting, allowing more lubricant to flow through your engine to extend engine life and maintain optimum reliability. Do not use fuel containing less 20% lubricant.

CAUTION 1

Methanol and nitromethane are poisonous and highly flammable. Keep out of reach from small children and keep away from heat and open flame.

GLOW PLUG

The type and quality of glow plug used in your engine will have a major impact on overall performance and reliability. All of the Thunder Tiger engines operate best with a R/C long-type plug such as Redline glow plugs, K&B, or O.S.No.8. Glow plugs (while of excellent quality) with a colder heat range may cause idle or throttle transition problems in smaller engines. Select the best glow plug by practical tests.

PROPELLER

Your engine is equipped with a high-performance stainless steel propeller that provides satisfactory performance over a wide rang of different hulls. The optimum propeller for your specific hull can only be determined after practical running tests. A general “rule of thumb” to follow is that the lower you run your prop in the water, the smaller the diameter of the prop needs to be in order to keep the engine R.P.M. in the ideal powerband for best performance. Determining the correct prop for your particular boat requires testing and patience. If your boat does not run well, there are some simple trouble-shooting tips described below. Keep in mind that factors such as hull length, weight, ride height, prop depth and engine R.P.M., combine to affect your choice of propellers.

CAUTION 1

It is extremely important to check the balanced of you propeller before you attempt to run the engine with your boat. An unbalanced propeller can cause substantial damage to the engine! A Thunder Tiger propeller balancer is easy to use and is available at your hobby dealer.

CAUTION 2

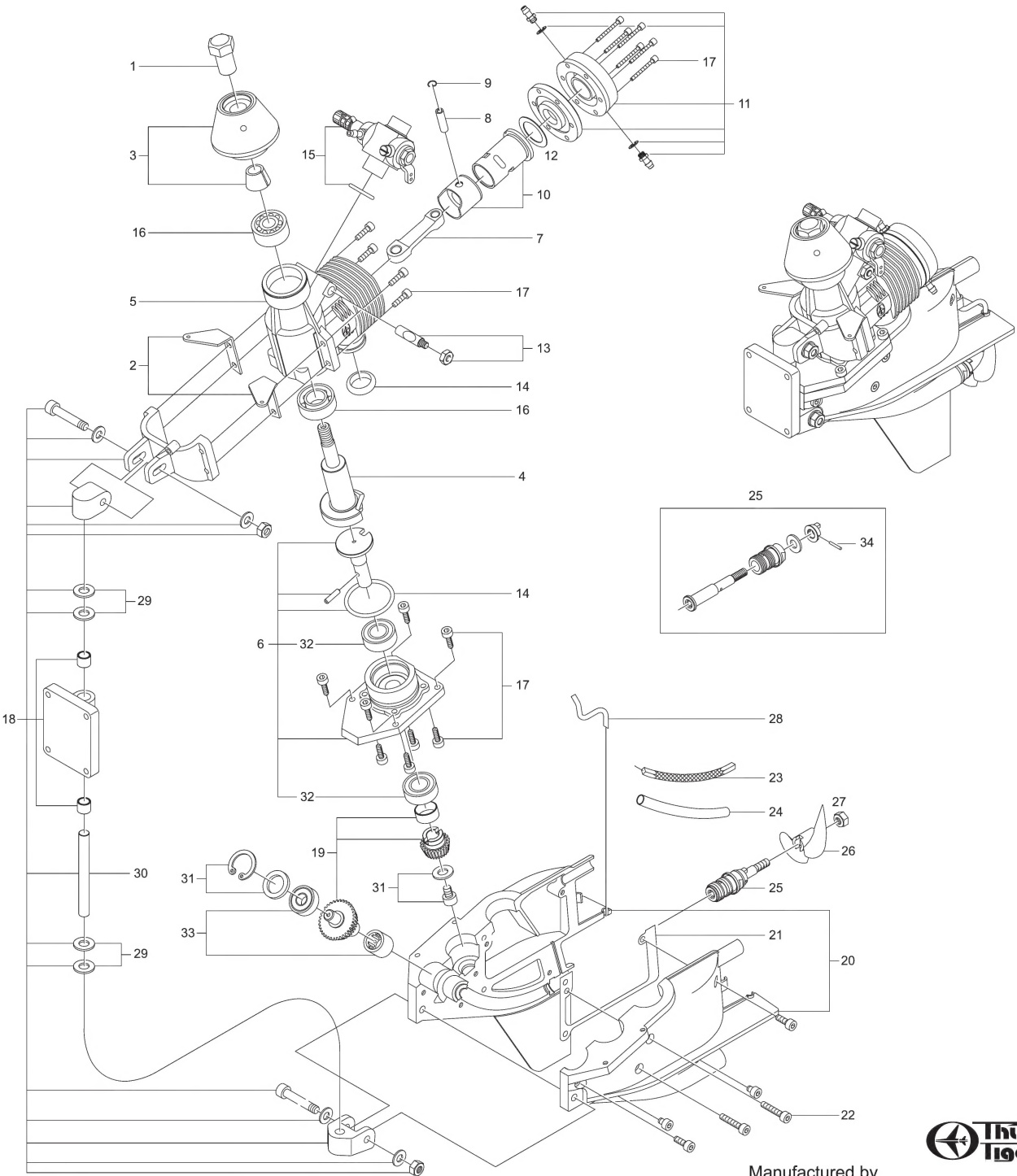
After balancing your propeller, make certain to balance and sharpen the prop to obtain the best performance.

PROPELLER TROUBLE-SHOOTING

PROBLEM	CAUSE	CORRECTIVE ACTION
The engine is turning high R.P.M., but the boat lacks speed.	1)The prop has insufficient pitch.	Try a prop with higher pitch.
	2)The prop produces insufficient thrust.	Increase prop diameter and reduce pitch.
The engine is over loaded, the boat runs slowly.	1)The pitch or the diameter of the prop is too large.	Select next lower pitch and/or smaller diameter prop.
	1) The prop diameter is to large.	Select a smaller diameter prop with higher pitch.

FUEL TANK INSTALLATION

The fuel tank should be located as close to the engine as possible. Ideally, the centerline of the tank should be level with the carburetor spray bar/needle valve assembly. Keep in mind that tank location can have a large impact on engine performance and CG (Center of Gravity) on your boat. Make sure that your entire fuel tank system is properly sealed and well-constructed to eliminate the possibility of fuel or air leakage.



Manufactured by
THUNDER TIGER CORP.
<http://www.thundertiger.com>

JA0248 V2|